

## REVISED OUTLINE OF PHOTOSCIENCE PROGRAM

The previous outline has been revised in order to take a larger interest in the chemical areas of the photographic process.

The entire course has been divided into two main groups:

- I. Physical Approach to Photographic Science
- II. Chemical Approach to Photographic Science

Lectures and laboratory for the two groups will run simultaneously.

### I. Physical Approach to Photographic Science

The physics of the process will be covered in 7-1/2 days of the total 18-day period. The areas to be covered are: photometry, sensitometry, densitometry, statistics, tone reproduction, color theory, and the proper approach to experimental analysis.

### II. Chemistry of the Photographic Process

The chemistry of the photographic process will be covered in six sessions encompassing a total of 9-1/2 days of lectures and laboratory periods. Topics to be covered in lecture include emulsion chemistry, latent image theory, theory of development, developer composition, exposure and processing effects, and an introduction to color processing chemistry. The laboratory periods will be used to conduct practical photographic processing experiments and emulsion making.

You will also have an opportunity to conduct a brief research project which will consist of a literature search, experimental design, laboratory work and data analysis. The project will be concluded with a final report.

First Session:

1st Day: A. Lecture (morning)

1. Emulsion Chemistry
2. Latent Image Theory
3. Mechanism of Development

B. Laboratory (afternoon)

Introduction to film exposing and processing.

Time - Gamma experiment - Importance of Laboratory

Notebook

2nd Day: A. Lecture (morning)

1. Photometry
  - a. Physical
  - b. Geometry

B. Lecture (afternoon)

1. Sensitometry  
Densitometry
2. Analysis of previous experimental data

3rd Day: A. Lecture (morning)

1. Photometry
2. Final analysis of experiment

Homework:

1. Read Mies and James
  - Chapter 1 pp. 1 - 9
  - Chapter 2 pp. 31 - 43
  - Chapter 5 pp. 87 - 97
  - Chapter 13 p. 282, pp. 303 - 306
  - Chapter 15
  - Chapter 19
  - Chapter 20

2. James and Higgins  
Chapters 1, 2, 3, 5
3. Prepare topic for Research Project
4. Photometry Problem Set

Second Session:

1st Day:

Lecture (1 day)

1. Exposure and Processing Effects
2. Developer composition

2nd Day:

Laboratory (1 day)

1. Preparing developers of various compositions
2. Sensitometric effects of composition variations

3rd Day:

A. Lecture (morning)

Statistics and methods of experimental analysis

B. Analysis of Data

Statistical evaluation of experimental results.

Determination of speed, gamma, etc.

Homework:

1. Statistics problem set
2. Practical photographic experiment
3. Read Mees and James; Chapters 6, 7

James and Higgins; Chapters 4, 6, 7

Third Session:

- 1st Day:
- A. Review Literature Search (1/4 day)  
for special project
  - B. Lecture (1/4 day)  
Reciprocity effects
  - C. Lecture (1/2 day)
    - 1. Tone Reproduction processes  
papers, film, flare, printing, etc.

- 2nd Day: Laboratory
- 1. Experiment on printing of negatives and  
flare effects
  - 2. Recording experimental results

- 3rd Day: Analysis of Tone Reproduction
- Relationships between film, flare, printing  
paper for system tone reproduction.

- Homework:
- 1. Prepare experimental design for special project  
and determine the necessary equipment and materials  
required.
  - 2. Read and prepare for emulsion making project (handouts).
  - 3. Review Mes and James  
James and Higgins } Chapter 2
  - 4. Experimental tone reproduction problems

Fourth Session:

- 1st Day:   A.   Lecture (1/2 day)  
              Review emulsion making
- B.   Laboratory (1/2 day)  
                  Prepare for emulsion making experiment - precipitation  
                  and ripening of an emulsion

- 2nd Day:   A.   Laboratory (1 day)  
              Remelt, sensitize and coat an emulsion

- 3rd Day:   A.   Laboratory (1 day)  
              Expose, process and evaluate the emulsion.  
              Discuss special project.

- Homework:   1.   Sensitometric analysis of emulsion and report.  
              2.   Mies and James; Chapters 16, 18  
                  James and Higgins; Chapters 7, 8.  
              3.   Chemical problem set

Fifth Session:

- 1st Day:   A.   Lecture (1/2 day)  
              1.   Post-development processes  
              2.   Review  
              3.   Reversal processes  
              4.   Introduction to color processing
- B.   Laboratory (1/2 day)  
                  Prepare for special project

2nd Day: A. Lecture (1 day)  
Color theory, color sensitometry, tri-color curve plotting, discussion of practical color problems.

3rd Day: A. Lecture (1 day)  
Reversal duplicating films and papers, negative-positive films and papers. Precision color processing.

Homework: 1. Color project - including exposure, processing, and printing of color film.  
2. Prepare for special project.

Sixth Session:

1st Day: Examination covering entire program (1/2 day).  
Start special project.

2nd Day: Continue on special project.

3rd Day: Finish special project.  
Review examination and entire program.

Homework: Analysis and evaluation of special project.  
Write up report on special project.